

Syllabus

Spring 2023

Course Title	EVEG 4780 – Special Topics in Environmental Engineering Design: Membrane Separation Processes
Instructor	Kofi Christie, Ph.D. Office: 3240F Patrick F. Taylor Hall Email: kchristie@lsu.edu Phone: 225-578-1523
Office Hours	Wednesdays, 4-5pm (and by appointment)
Class Time and Location	Tuesdays and Thursdays, 3-4:20pm Room 1735, Business Education Complex
Course Overview	The development of membrane separation processes has been impactful in the global effort to manufacture chemicals, produce energy, provide clean water, control medical/pharmaceutical transport, maintain environmental health, and manufacture commodities. The goal of this course is to provide fundamental context on the membrane preparation and transport theory that support these applications.
Learning Objectives	<ul style="list-style-type: none"> • Students will gain the ability to distinguish varying membrane separation processes and their primary applications • Students will gain the ability to employ fundamental physical and chemical relationships to analyze membrane separation processes • Students will gain the ability to identify and apply membrane design concepts • Students will gain the ability to apply fundamental membrane theories to solve problems in separation processes
Primary Textbook	Ismail, A. F., Matsuura, T. (2021). <i>Membrane Separation Processes: Theories, Problems, and Solutions</i> . Netherlands: Elsevier Science.
Other Textbooks	Baker, R. W. (2012). <i>Membrane Technology and Applications</i> . United Kingdom: Wiley. Mulder, M. (2012). <i>Basic Principles of Membrane Technology</i> . Netherlands: Springer Netherlands.

Course Schedule

Class	Date	Topic	HW Assigned	Assessment
1	1/17/2023	Overview of membrane science and technology		
2	1/19/2023	Solubility parameter	HW 1	
3	1/24/2023	Solubility parameter		
4	1/26/2023	Triangular phase diagram		Quiz 1
5	1/31/2023	Reverse osmosis		
6	2/2/2023	Reverse osmosis	HW 2	
7	2/7/2023	Reverse osmosis		
8	2/9/2023	Exam 1		Exam 1
9	2/14/2023	Nanofiltration	HW3	
10	2/16/2023	Ultrafiltration and microfiltration		
11	2/21/2023	Mardi Gras Holiday (no class)		
12	2/23/2023	Ultrafiltration and microfiltration		
13	2/28/2023	Membrane gas separation		Quiz 2
14	3/2/2023	Membrane gas separation	HW 4	
15	3/7/2023	Pervaporation		
16	3/9/2023	Exam 2		Exam 2
17	3/14/2023	Spring Break (no class)		
18	3/16/2023	Spring Break (no class)		
19	3/21/2023	Membrane distillation	HW 5	
20	3/23/2023	Membrane distillation		
21	3/28/2023	Membrane distillation		Quiz 3
22	3/30/2023	Membrane contactors and membrane absorption	HW 6	
23	4/4/2023	Membrane contactors and membrane absorption		
24	4/6/2023	Exam 3		Exam 3
25	4/11/2023	Careers in membrane science		
26	4/13/2023	Membrane modules		
27	4/18/2023	Membrane modules	HW 7	
28	4/20/2023	Membrane systems		
29	4/25/2023	Membrane systems		Quiz 4
30	4/27/2023	Cost of water	HW 8	
31	5/2/2023	Cost of water		
32	5/4/2023	Last class (final review)		
33	5/11/2023	Final exam (7:30 am – 9:30 am)		

Course Policies and Grading

- Moodle will be used as the primary method for disseminating assignments and other course materials. Class attendance and punctuality are expected
- No make-up exams will be given unless prior arrangements are made (or existing accessibility/disability accommodations are approved by the university)
- All homework is due the following class period
- Late assignments will receive half credit, at most
- All homework must be presented neatly with the final answer clearly identified
- All work must be shown, and assumptions should be explicitly stated
- The instructor reserves the right to curve grades when appropriate
- The comprehensive final exam in the class is scheduled for Thursday, May 11, 7:30am – 9:30am in BEC 1735

Graded Item Weighting	
Attendance	5
Participation	5
Homework	15
Quiz	20
Exam 1-3	25
Final Exam	30
Total	100

Letter Grade	Numerical Grade
A	90-100
B	80-89.9
C	70-79.9
D	60-69.9
F	Below 60

Classroom Civility

Students are expected to assist in maintaining an environment that is conducive to learning. To create an environment in which learning is the primary objective, students should refrain from posting, sharing, sending, or emailing inappropriate material. All methods of interaction should be used to communicate effectively with one another and further enhance the student’s educational experience. Students should be dressed appropriately and conducting themselves in a professional manner during class sessions. In general, treat the instructor and other class members with respect.

LSU Diversity Statement

We believe diversity, equity, and inclusion enrich the educational experience of our students, faculty, and staff, and are necessary to prepare all people to thrive personally and professionally in a global society. Therefore, LSU is firmly committed to an environment that affords respect to all members of our community. We will work to eliminate barriers that any members of our community experience.

To make LSU a place where that can happen, we must recognize and reflect on the inglorious aspects of our history. We now acknowledge the need to confront the ways racism, sexism, ableism, ageism,

classism, LGBTQ+ phobia, intolerance based on religion or on national origin, and all forms of bias and exploitation have shaped our everyday lives.

We accept personal and professional responsibility to eliminate bias and oppression wherever they are found. We understand our obligation to speak up when we see bias whether it be in our teaching, study, or daily work. Our community will educate themselves proactively and continuously about how to intervene and bring bias to the attention of others with commitment and compassion.

We will hold ourselves accountable for our actions and inactions, and for maintaining intentional, measurable, and meaningful efforts to enhance diversity, equity, and inclusion, including through ongoing evaluation of our policies, practices, and procedures.

Support Services

Louisiana State University offers a variety of student services to help make students be successful both in and out of the classroom. If you need assistance, please note the following resources are available.

- [Career Services](#) – 158 LSU Student Union, 225.578.2162
- [Center of Academic Success](#) – B31 Coates Hall, 225.578.2872

The Center for Academic Success offers free resources to help students increase their academic performance. Content specific-support includes tutoring, Supplemental Instruction (twice weekly, peer-led study sessions), and Shell Study Groups (informal study sessions facilitated by trained peer tutors). For help developing learning strategies, managing time, and increasing test performance, one-on-one Academic Coaching and strategy workshops help students plan their path toward academic success in all their classes.

- [College of Engineering Counselors](#) – 2228 Patrick F Taylor, 225.578.5731
- [Student Health Center](#) – 225.578.6271
- [Tiger Trails Bus Service](#) – Tiger Trails LSU bus service provides free transportation around Baton Rouge. Download the TransLoc app for real-time bus locations.
- [LSU Food Pantry](#) – 1st Floor LSU Student Union, 225.578.8000

The mission of the LSU Food Pantry is to provide supplemental food to students in need who may experience hunger or food insecurity.

- [LSU Cares](#)

LSU Cares is a university initiative dedicated to the well-being of students and promotion of a community that cares about each of its members.

- [Office of Disability Services](#)

If you have a disability that may have some impact on your work in this class and for which you may require accommodations, then see a staff member in the Office of Disability Services (112 Johnston Hall) so that such accommodations can be considered. Any accommodation requests must be submitted via email during the first 2 weeks of class.